

C comparing the parameter with a reference value determined before the change in current direction.

C2 28. (Twice amended) An electromagnetic flowmeter arrangement comprising a measuring tube, a coil arrangement for generating a magnetic field substantially perpendicular to the direction of flow through the measuring tube, an electrode arrangement substantially perpendicular to the direction of flow and to the magnetic field, a supply system for the coil arrangement which has a current direction change-over arrangement, and a testing device, the testing device including means which, after a change over of the current direction, determines at least one parameter of the rise in the current in the coil arrangement and compares the parameter with a given value determined before the change over of the current direction.

REMARKS

The Examiner's further reconsideration of the application is requested in view of the amendments above and comments which follow.

Turning first to the rejection of claims 18 - 35 under 35 U.S.C. § 112, the rejection is simply not understood. The only claim having the "checking unit" language is claim 32, and claim 32 has been cancelled in the previous amendment mailed November 29, 2001 (and apparently not received until January 11, 2002 given the mail cleansing procedures then in effect). Thus, no issue remains, and retraction of the rejection is requested. Should any matters remain for consideration, it is requested that the examiner be more explicit since the examiner's position is simply not understood, given the cancellation of claim 32.

In numbered paragraph 3 beginning on page 2 of the Office Action, the examiner has rejected

claims 18 - 35 (actually 18 - 31 and 33 - 35 since claim 32 has been canceled) under 35 U.S.C. § 102 as being anticipated by Gaertner U.S. Patent number 4,784,000. The Examiner asserts that Gaertner teaches a flowmeter having a current direction change - over arrangement 25 and a testing device 61, 71 which determines at least one parameter of the rise in the current and compares that parameter with a given value. Reconsideration is requested, since, upon reconsideration, it will be seen that the Examiner's interpretation of Gaertner is incorrect.

Turning to Figure 3 of Gaertner, items 61 and 71 do not constitute a testing device, as the examiner has asserted. Item 61 is a decade counter (a timer), giving the clock and the predetermined sampling instants for measuring the current in the coil. Item 71 is an operational amplifier, which integrates the differences in the sampled currents. In fact, the entire circuit of Figure 3 of Gaertner is a control circuit whose purpose is to keep the coil current constant. See, for example, column 6, line 64 through column 7, line 5.

In the present application, in distinction, the aim is not to keep the coil current constant. This can be seen from the fact that the applicant already has a current regulator 18, 34 (see Figures 1 and 2 of the present application), whose task is to create a constant current through the coil. That is explained in relation to the regulator 18 in the specification at page 6, beginning at line 22. The regulator 34 of the second form of the invention is similar, as explained at page 8, beginning on line 6.

In the Examiner's arguments at page 3, beginning in line 7, the Examiner asserts that Gaertner has "a checking unit which checks to see if the time ascertained differs by more than a predetermined difference from a given value". For this assertion, the Examiner points to column 9, lines 3 - 45. This, however, is incorrect. The referenced section of Gaertner refers to times at which

consecutive samples of the current "at a constant value" are taken. This section does not refer to, and has no relation to, a variable rise time of the coil current. Nothing in Gaertner discloses or suggests such.

In numbered paragraph 4 beginning on page 3 of the Office Action, the Examiner refers to the arguments previously presented by the applicant, and disagrees with those arguments. In fact, Gaertner and the invention of the present application solve two different problems and use two different solutions. Gaertner solves a control problem, but, contrary to the claimed invention of the present application, is not interested in testing the coil to see if it has changed over time. In the present application, the intent is to tell the user of the flowmeter whether or not the meter is still working in a trustworthy fashion. Nothing of that nature is suggested by Gaertner.

Regarding the issue as to whether Gaertner provides information about the dynamic magnetic behavior, in relation to the present invention, the significant part of the current curve shown in Figure 6 of Gaertner is the clock period between 0 and 1. This is the rise time which is of no interest whatsoever to Gaertner, but which is of particular interest in the present application. During this time, i.e., shortly after a change over in the current direction, an analysis of the magnetic behavior of the coil can be made and compared to the reference value. This is not the case in the upper most figure of Gaertner's Figure 6, and in fact, Gaertner does not want any variations in the coil current. In distinction, the invention of the present application is based upon detecting a variation.

Finally, the applicant does not disagree with the examiner's comments that since sampling in Gaertner is done at different times, there is a reference value that is determined at an earlier time. This reference value, however, is a bare circuit amplitude and does not contain any information about the magnetic behavior of the coil. In the invention of the present application, in distinction, the

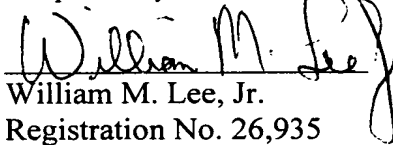
reference value retains information about the property of the coil, e.g. the rise time. This is a "fingerprint" of the system holding information about the electrical and magnetic properties of the flowmeter. In order to emphasize this difference, which has previously been argued, claims 18 and 28 have been amended to add a concluding clause that makes it clear that the reference value is determined before the change in the current direction. Basis for the amendments to the two independent claims is found throughout the specification, and in particular, for example, in the paragraph on page 2 at lines 22 through 28.

It is therefore submitted that the application, as amended, clearly distinguishes from Gaertner and is allowable thereover. The Examiner's further and favorable reconsideration of the application is therefore urged.

As this response is being sent during the fourth month following the Examiner's Office Action, an appropriate petition for extension of time is also submitted herewith.

July 26, 2002

Respectfully submitted,



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(Amended) A method for testing an electromagnetic flowmeter having a measuring tube and a coil arrangement for generating a magnetic field perpendicular to the direction of flow through the measuring tube, the current direction in the coil arrangement being periodically changed, comprising the steps of sensing the change in the current direction, and after the change in the current direction determining at least one parameter of the current rise and comparing the parameter with a reference value determined before the change in current direction.

28. (Twice amended) An electromagnetic flowmeter arrangement comprising a measuring tube, a coil arrangement for generating a magnetic field substantially perpendicular to the direction of flow through the measuring tube, an electrode arrangement substantially perpendicular to the direction of flow and to the magnetic field, a supply system for the coil arrangement which has a current direction change-over arrangement, and a testing device, the testing device including means which, after a change over of the current direction, determines at least one parameter of the rise in the current in the coil arrangement and compares the parameter with a given value determined before the change over of the current direction.